

LISTING OF CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Claims 1-30 (Canceled).

Claim 31 (Currently Amended): A method of manufacturing a power MOSFET, comprising:

epitaxially growing a drift layer of a first conductivity type on a first conductivity type semiconductor substrate used as a drain layer, said drift layer being doped with impurities having a concentration distribution increasing up to said semiconductor substrate;

epitaxially growing a base layer of a second conductivity type on said drift layer;

forming a source region of the first conductivity type on said base layer;

forming a trench penetrating said source region and said base layer to reach at said drift layer; and

forming a trenched gate structure including a gate insulating film and a gate electrode, said gate insulating film having a thin portion facing said base layer and a thick portion facing said drift layer and having a bottom portion reaching into the drain layer.

Claim 32 (Currently Amended): The method of manufacturing a power MOSFET according to Claim 31, wherein said ~~forming~~ growing the drift layer comprises:

forming a first epitaxial layer of the first conductivity type on said semiconductor substrate with a first impurity concentration;

forming a second epitaxial layer of the first conductivity type ~~of~~ on said first epitaxial layer with a second impurity concentration lower than ~~that~~ the first impurity concentration of said first epitaxial layer; and

heat treating said first and second epitaxial layers for smoothing the first and second impurity concentrations.

Claim 33 (Original): The method of manufacturing a power MOSFET according to Claim 32, which further comprises:

implanting impurities from a surface of said second epitaxial layer up to a predetermined depth thereof; and

diffusing the implanted impurities into said second epitaxial layer to form a peak of the impurity concentration in said second epitaxial layer.

Claim 34 (New): A method of manufacturing a power MOSFET, comprising:

epitaxially growing a drift layer of a first conductivity type on a first conductivity type semiconductor substrate used as a drain layer, said drift layer being doped with impurities having a concentration distribution increasing up to said semiconductor substrate;

epitaxially growing a base layer of a second conductivity type on said drift layer;

forming a source region of the first conductivity type on said base layer;

forming a trench penetrating said source region and said base layer to reach at said drift layer; and

forming a trenched gate structure including a gate insulating film and a gate electrode, said gate insulating film having a thin portion facing said base layer and a thick portion facing said drift layer,

wherein said growing the drift layer comprises,

forming a first epitaxial layer of the first conductivity type on said semiconductor substrate with a first impurity concentration,

forming a second epitaxial layer of the first conductivity type on said first epitaxial layer with a second impurity concentration lower than the first impurity concentration of said first epitaxial layer, and

heat treating said first and second epitaxial layers for smoothing the first and second impurity concentrations.

Claim 35 (New): A method of manufacturing a power MOSFET, comprising:

epitaxially growing a drift layer of a first conductivity type on a first conductivity type semiconductor substrate used as a drain layer, said drift layer being doped with impurities having a concentration distribution increasing up to said semiconductor substrate;

epitaxially growing a base layer of a second conductivity type on said drift layer;

forming a source region of the first conductivity type on said base layer;

forming a trench penetrating said source region and said base layer to reach at said drift layer; and

forming a trenched gate structure including a gate insulating film and a gate electrode, said gate insulating film having a thin portion facing said base layer and a thick portion facing said drift layer,

wherein said growing the drift layer comprises,

forming a first epitaxial layer of the first conductivity type on said semiconductor substrate with a first impurity concentration,

forming a second epitaxial layer of the first conductivity type on said first epitaxial layer with a second impurity concentration lower than the first impurity concentration of said first epitaxial layer,

heat treating said first and second epitaxial layers for smoothing the first and second impurity concentrations,

implanting impurities from a surface of said second epitaxial layer up to a predetermined depth thereof, and

diffusing the implanted impurities into said second epitaxial layer to form a peak of the impurity concentration in said second epitaxial layer.